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## AMERICAN WORK ON RECENT MOLLUSCA IN 1881.

BY WILLIAM H. DALL.

SINCE the appearance of our last record (1880), death has claimed Mr. Chas. M. Wheatley, of Phoenixville, Pennsylvania, who was formerly noted for his interest in fresh-water shells, and for whom several American species have been named. He did little original work in this field, but in geology and palæontology, especially the exploration of certain bone-bearing caves, his contributions to science have been gratefully recognized.

The recorder would renew his request to authors to furnish him, as promptly as practicable, with separate copies of their publications on recent mollusks,<sup>1</sup> in order that the completion of this record may be made as early in the succeeding year as possible, and he would also suggest to writers not resident in America that any papers bearing on American mollusca or especially interesting for any reason to American malacologists, will, if copies are furnished, be duly noted in the record.

The year shows a creditable amount of work done, and is especially notable for the investigations into the mollusks of the deep sea (of which *Pleurotomaria* is not the least interesting); the contributions to our knowledge of the Cephalopoda of our eastern coast; and the researches into the egg and early stages of *Limax campestris* and the generalizations resulting therefrom.

An account of recent progress in zoölogy for the years 1879 and 1880, by Dr. Theo. Gill, appears in the Smithsonian Report for 1880, separate advance copies being issued in 1881. It contains a résumé of the more remarkable advances in our knowledge of mollusks during the period mentioned. We are informed that similar reports may be hoped for annually hereafter in the Smithsonian Report on various subjects and by several hands.

*General works.*—Mr. Tryon's Manual of Conchology has completed its third volume in 1881 covering the Tritonidæ, Fusidæ and Buccinidæ. When, in 1879, this work was announced, it was stated that it was proposed "to compile a conchological manual which while more comprehensive than any similar work hitherto published, shall be so condensed in text and illustration that it may be issued at a much more moderate price. It will include in systematic order the diagnoses of all the genera and

<sup>1</sup> Which may be sent care of the Smithsonian Institution, Washington, D. C.

higher divisions of the mollusca, both recent and fossil, and the descriptions and figures of all the recent species," etc., etc. We have hitherto refrained from comment upon the manner in which the performance compares with the promises above quoted from the second page of the cover. This, both from our wholly friendly feeling towards the industrious author, and from the hope that as the work advanced, the quality of it (once off unfamiliar ground like the Cephalopods) might improve. The fourth volume has now begun to appear, and it seems to us that it is time to vindicate malacology in this country from the reproach of quietly accepting such a work as this as a praiseworthy or representative product of American science.

The work is an utter failure if we judge it by its own prospectus. In the plain edition the figures are largely unidentifiable. In the (very badly) colored edition they are somewhat more recognizable, though we had not realized that so many blue and crimson gasteropods existed as are there depicted. The expense so far for a bound copy would be about \$65, a sum sufficient to obtain quite a little library in itself, and at this rate the claim of a "moderate price" is quite unjustified. There is not a figure in the entire work, so far, by which it would be possible to discriminate between critical species, several of the figures are wrongly numbered, the "descriptions" are inadequate to a painful degree, and contain, in many cases, no diagnostic characters. Were diagnoses of "all the genera" of recent and fossil mollusks really furnished, even if merely copied from the originals without confirmation, the work would still be valuable, but that this is not the case in the families treated, can be determined by any reader.

In general, an uncharitable critic might be disposed to say that the author, when he found a species of which he could not copy a figure, "lumpèd" it with that which he "guessed" was nearest like it, or if he could not identify it with anything in the collection at Philadelphia, he catalogued it with the "spurious" species. We do not assert that Mr. Tryon has done anything of this kind, but we do assert that the results of his work, in whatever way he arrived at them, are little better than they would have been in the above hypothetical case.

Little care or research seems to have been devoted either to hunting up the locality where species not in the monographs were described or in figuring unfigured species which were easily

within the author's reach. Indeed, we have noticed, so far, but one original figure in the whole work, though there may be more. Of a species described in the Proceedings (1865, p. 64) of his own society, the Philadelphia Academy of Natural Sciences, and of which the type is accessible to all students in the National Museum at Washington, but a few hours away from his home, Mr. Tryon says, "no diagnosis of this species has been published, it is merely mentioned in Carpenter's 2d Report, and figured in Küster from a drawing furnished by W. H. Dall." This "drawing" was one of the plates of Alaska mollusks distributed by the writer in 1879, but of which the text is still in MS. owing to uncontrollable circumstances.

The merits of the work are those pertaining to any catalogue which brings together scattered material, and would have been greater had not an illjudged attempt been made to combine species not autoptically known to the author, and of the distinctness of which he could not therefore speak with authority. It certainly will not be, to a student requiring a real "manual" of the subject, comparable in value to works like Bronn and Keferstein's *Malacozoa*, for instance, and others of which the combined cost would be less than that of the few parts of Mr. Tryon's work already issued.

It is somewhat refreshing to turn from the preceding work to another, which though not American in authorship or publication, is nevertheless of so much importance to American, as well as other students of malacology as to render its mention here not inappropriate. I refer to Dr. Paul Fischer's *Manuel de Conchyliologie* (Paris, F. Savy, 1881-2, fasc.1-4. To contain six or seven fasciculi of seven signatures each, 400 cuts in the text and 24 plates with 600 figures), of which (to May, 1882) four parts have appeared. The subscription (payable in advance) for the whole work, is twenty-four francs. The typographical execution is of excellent quality, the illustrations in the text clear, and many of them new; the form, medium octavo, is convenient; and of the execution so far, more need not be said than that it is promptly up to date in matters of research, and in every way worthy of its distinguished author.

"Common Sea Shells of California," by Josiah Keep, A.M., Alameda, Cal. This little work prepared and published by its author, a teacher in the Alameda High School, contains sixty-four pages

of text and sixteen plates, figuring ninety-five species of Californian shells, which are described in a conversational way in the text. Little is said of systematic classification, and wisely so. As it is, the book is well suited to assist the young to a knowledge of the names and more obvious characters of the shells they are likely to find on the shore, and to interest them in the general subject. The figures are very characteristic and in many cases unusually good.

The draughtsman with some instruction would evidently do better work than is common. But we trust that, should Mr. Keep issue a larger work, as it has been hinted he would do, and his present draughtsman should assist, the latter will examine some standard works (like Adams' Genera, for instance) and observe that the axis of the spire should be kept at right angles to the line of sight, by which the foreshortening and distortion which spoil some of his figures of Gastropods (*e. g.* Pl. VI, Figs. 4, 6, 7; Pl. VII, Figs. 1, 2) will be entirely avoided. This criticism excepted, we cordially welcome the little book, which can be obtained of the author himself for the price of one dollar, by those who wish to encourage such enterprise.

*Anatomy, Physiology and Development.*—The most important work in this department which has appeared during the past year is that on the "Maturation, fecundation and segmentation of *Limax campestris* Binney," by E. L. Mark (Bull. Mus. Comp. Zoöl., VI, No. 12, 8vo, pp. 173-625, Pl. 1-v, Oct., 1881). This paper, according to a note by the author, was prepared early in 1879, though its publication has been long delayed, and has already been noticed in the NATURALIST. Its length and character forbid any attempt at analyzing it in detail here. This is the less to be regretted, since those who are in a position to profit by the observations and deductions therein set forth, will by no means fail to inform themselves from the original, while any attempt to condense for others the deductions from such investigations, could hardly result in an adequate representation of the author's position. The work, in execution and presentation, is creditable to American science and to the author, and will form, we hope, merely a beginning of his achievements in this direction.

A reference was made in the record for 1880 (p. 709) to Professor Alpheus Hyatt's lecture on the "Transformation of Planorbis at Steinheim." In the Proceedings of the Am. Assoc. Adv. Sci-

ence (vol. XXIX, Boston meeting) published June, 1881, is a combination of an abstract of the lecture, together with "remarks upon the effects of gravity upon the forms of shells and animals (pp. 1-24, Pl. 1-11, separate copies). In this extremely suggestive paper, Professor Hyatt, after discussing the particular case of the Steinheim Planorbis, strives to "bring into comprehensible shape the following conceptions." The conceptions are chiefly to the effect that the unsymmetrical spirality of most gasteropod shells is due to the effects of gravity transmitted by heredity. That many locally constant characteristics are due solely to the physical influences of the environment. That natural selection does not explain these relations, but only serves to fix the results and bring them within the reach of heredity, when they may be inherited according to the law of heredity with acceleration. That gravity appears to be one of the causes of the differences in effort, function and anatomy observed between various parts of animal forms when laterally or vertically considered. That the bilateral or *geomalic* (the tendency to equalize the form in direction of a horizontal plane) growth of organs or organisms appear to be directly or indirectly responses to the demands of gravity. Lastly, that the origin of the limbs in pairs, while mere buds, perhaps, may be the results of attempt at maintaining equipoise by geomalic growth in obedience to the laws of gravity.

That this effect of gravity is marked in animals which become permanently and immovably fixed, like the oyster (and only after they become attached) Professor Hyatt shows to be the case in many instances, and that he has suggested an hitherto overlooked *vera causa* there seems to be no doubt; though its effect in modifying, for instance, the cone of molluscan shells, seems less likely than that the inevitable divergencies from a true cone produced by the physical necessities of the environment, in perhaps a majority of cases, were seized on by natural selection on account of the advantages gained by economy in material, in space occupied, strength resulting and protection insured to delicate internal organs by the spirality of the shell. Supposing all conchifers to be born with a straight conical shell, it is self-evident that unless the creatures were pelagic or very sedentary, that fractures and unequal developments of the margin of the cone would be the case in a majority of individuals. That in fact the conical form would be a decided disadvantage to any creature which had

to travel for its living. That every divergence from a true cone would be an advantage and would lead to hereditary retention or repetition of the divergence, and that spirality (as we know) must necessarily result from any deviation from the straight cone whether due to a mere accidental fracture or any other cause. Knowing this and knowing that in most active mollusks gravity could not act in the same way and direction for five minutes at a time, owing to their changes of position, it does not seem that there is any need of it to account for the development of the spiral in the shells of free gasteropod mollusks.

But whatever view may be taken of single details, Professor Hyatt's paper possesses, like most of his writings, the invaluable quality of arousing discussion, exciting interest and of suggesting new lines of thought; and of such essays we cannot have too many. \*

Although first printed in the *Quarterly Journal of Microscopical Science* (London, 1881) and the result of studies by a native of Japan, K. Mitsukuri's paper "On the structure and significance of some aberrant forms of lamellibranchiate gills" (Studies from the Biological Laboratory, Johns Hopkins University, II, No. 2, pp. 257-270, Pl. XIX, Mar., 1882) may be considered as in one sense American work, since it was done at the laboratory of an American university and under the instruction and direction of Professor W. K. Brooks. The author here considers the structure of the gills of *Nucula* and *Yoldia* and their relation to the gills of other acephalous mollusks. He arrives at the general conclusion that the Lamellibranchiate gill was perhaps originally a simple ridge on the side of the body, but to increase the surface of contact with the water, folds may have arisen on two sides of this ridge. If this be true, *Nucula* and *Yoldia* have advanced so far as the gills are concerned, but very little beyond the primitive condition. In course of time, however, as some forms of *Acephala* became less capable of extensive locomotion, these folds were perhaps prolonged to form tentacular filaments, from which were finally evolved complex gill structures like those of *Mytilus*, *Unio* and *Ostrea*, which took on other functions than respiration, such as assisting in the food supply by means of the currents generated by their cilia. Between the simple gills of *Nucula* and the complex ones of *Unio*, there are many intermediate stages with modifications in different directions.

In considering these views it should be borne in mind that the gills (especially in Gasteropods) are almost purely epithelial structures, and therefore especially liable to modification; in most cases they hardly exist in the embryonic stages. As regards the correlation of inactivity with a high type of gill structure, it is perhaps doubtful how far this will bear inspection. *Yoldia* is extremely active, but is almost like the sedentary *Nucula* in its gills: *Unio* which has, according to Mitsukuri, highly specialized gills, is, probably, in many cases nearly as active as *Yoldia*. *Cardium* and *Pecten* are remarkable for their activity, and have highly developed gills, as also have *Sciintilla* and *Lepton*, which move about almost like Gasteropods.

Whatever be the fate of incidental speculations of the author, the paper is most suggestive and interesting, and may be taken as an intimation of what is in store for malacology when the embryologist and anatomists shall join forces and carry their investigations from the young stages to the fully developed adult form with greater continuity than appears to be the rule at present.

Report of the Commissioners of Fisheries of Maryland, Jan., 1880 (8vo, pp. LXXVIII, 1 l. unp., 269, 8; and 16 plates and sections), Annapolis, State printers, 1880.

Report of T. B. Ferguson, a commissioner of fisheries [for the western shore] of Maryland, Jan., 1881, 8vo, Hagerstown, Bell & Co., 1881 (pp. CXIV, 152, 6; and 18 plates besides cuts in the text).

The contents of the first report were alluded to by the recorder in his summary for 1881, but not having been procurable by him until a late date, exact references to its contents are now added. The appendix contains the account of the "Development of the American Oyster," by Dr. W. K. Brooks, which occupies pp. 1-102, with ten plates; "Extracts from the Report of Master Francis Winslow, U.S.N., made to C. P. Patterson, superintendent coast and geodetic survey, of investigations of the oyster beds in Tangier and Pocamoke sounds and parts of Chesapeake bay, 1878-9," comprising pp. 103-219, with four sections, and lastly, a compend of the "Oyster laws," which, it is alleged by disinterested parties, are never enforced except against non-residents, and hence are practically a dead letter.

The second report is made by Major Ferguson, on the Fisheries-work which came under his own supervision, the State law



allotting one commissioner each to the eastern and western shores. The report itself relates chiefly to vertebrate fisheries, but the appendix is devoted entirely to invertebrates and further "Oyster laws" are included in the compendium which closes the volume.

The appendix consists of (1) an Account of experiments in oyster culture, by John A. Ryder; (2) an Account of an experiment in artificially fertilizing the ova of the European oyster, by Master Francis Winslow, U.S.N. (referred to in this record for 1880); (3) a Bibliography of literature (38 entries) relating to oyster culture; and (4) Notes on some of the early stages of development of the clam or mananose (*Mya arenaria* L.) by John A. Ryder.

The first paper contains an account of the anatomy of the oyster, with illustrative diagrams. Several points are developed more fully than has been done by previous writers; the author's attention is, however, chiefly directed toward the digestive, reproductive and respiratory tracts, and the account does not claim to be by any means complete. The pedal (?) muscles are not noted, an omission characteristic of most papers on the oyster. It is concluded that the oyster is diœcious. The "fat" of the oyster is not fat at all, but though containing some oil globules, is a deposit of delicate protoplasm, easily digestible and nutritious, which is almost wanting in breeding oysters, which are, therefore, far less desirable as food. The food of the Chesapeake oyster is discussed, and an instance is mentioned where a *Pinnotheres* with eggs was found established in the shell of an oyster upon which again were attached numbers of *Vibriones* and *Zoöthamnium* colonies, whose increase, in all probability, formed part of the food supply of the mollusk, so that host and messmate were mutually benefited. The fauna of the oyster beds is enumerated, with many notes on the various species mentioned. There are but few mollusks, including the "soft-shell clam" (*Mya*); a species of *Modiola*; *Xylotrya fimbriata* which rapidly destroys the woodwork of hatching boxes, etc; *Solecurtus gibbus*; *Crepidula glauca*; *Litorina irrorata*; *Urosalpinx cinereus*, the "drill" or oyster borer; and some small gasteropods (probably in part *Astyris* and *Cerithiopsis*), including some nudibranchiates. The artificial fertilization of the ova is then treated of and is undoubtedly practicable, but the further preservation of the embryo oysters has so far

failed entirely on account of their minute size, and in spite of the sanguine hopes expressed by Messrs. Ryder and Brooks, there does not appear to us to be any reasonable prospect of success in the project except at an expense which would in practice prove prohibitory. Mr. Ryder also gives figures of young oysters of known age, which illustrated the greater energy and extent of growth in the American (*O. virginiana*) as compared with the European (*O. edulis*) oyster.

The second paper was noticed in this record for 1880, and in view of possible doubts as to the species of oyster observed upon, it is desirable that the experiment should be repeated with undoubted *O. edulis*. It is really surprising that, with their facilities, the European naturalists have hitherto failed to give us a comprehensive monograph of one of the commonest and perhaps the best known mollusk in the world.

The name "clam" in America is commonly applied to any bivalves not "mussels" or "cockles." In New England the clam is *Mya arenaria*, in New York it is *Venus mercenaria*. In the former region the Venus is known as the "hard" or "round" clam; in the latter the Mya is called "soft shell" or "longneck" clam. The name "mananose" is a southern appellation for the Mya, perhaps of Indian origin. Mr. Ryder's observations on the early stages of Mya are full of interest. This mollusk spawns in September and October during a period of about forty days. It is diœcious. The changes in the egg succeed each other with considerable rapidity, and as in the development of the oyster there are marked periods of active change of form which alternate with periods of repose. Bilateral symmetry is marked. The eggs are about  $\frac{1}{800}$  inch in diameter. Their segmentation, as far as followed, resembled that of Anodonta, and the gastrula stage is formed in the same way as in the oyster.

A portion of a letter from Mr. Henry Hemphill, of California, relating to variations due to station, in the genus *Acmaea* appears in Proc. Acad. Nat. Sci. Phil., 1881, pp. 87-8, in which the identity of the so-called *Nacella instabilis* Gld., with *Acmaea pelta* Esch., is claimed. The recorder showed long since that the "Nacellæ" of Carpenter's lists were all referable to *Acmaea* except one, which is an Anisomyon belonging to the Siphonariidæ. If an examination of the soft parts confirms Mr. Hemphill's views, it will be a very striking illustration of the influence of food and station on external characters.

"Observations on Planorbis" (Proc. Acad. Nat. Sci. Phil., 1881, pp. 92-110), by Dr. R. E. C. Stearns, discusses several interesting questions, such as "Are the shells of Planorbis dextral or sinistral?" He finds most of the species examined sinistral, others dextral and occasionally the same species may be coiled either way. Certain aspects of variation in American Planorbes are considered and pregnant suggestions made. The paper is well illustrated.

An abstract of a paper by Professor E. S. Morse, on changes in the proportions of *Mya* and *Lunatia* since the Indian shell-mound period (if such an expression may be permitted when the mounds were probably added to continuously up to the historic period), appears on p. 323, *Am. Journ. Sci.*, xxii, Oct., 1881, and an erratum to the same on p. 415. Professor Morse, as in Japanese shell-heaps, believes he has found good evidence of a change in the proportions of these shells in the differences between the average measurements of a large number of specimens from the shell-heaps on the one hand, and from the present shore on the other. While there seems no reason why such a change may not have taken place, it is still evident that the satisfactory demonstration of the proposition is beset with no little difficulty. The original paper was read before the Cincinnati meeting of the American Association for the Advancement of Science, in August, 1881.

S. P. Robins has an article on "Natural selection and the ink bag of dibranchiate Cephalopods," in the *Canadian Naturalist* (ix, No. 9, pp. 414-420, Dec. 29, 1880), containing some speculations on this subject.

Minot has, in the *Journal of Otology* for 1881, an article in which the available information on the otoliths of mollusks is brought together, but the recorder has not seen a copy of it.

*Abyssal mollusks, faunal and descriptive papers.*—The mollusks of the deep sea have recently attracted considerable attention. Owing to their peculiar relations to the faunæ of other shores, the deep-sea animals have some right to be considered under a separate head. Those of the Gulf of Mexico and the Caribbean sea, dredged by the *Blake*, form the subject of a "Preliminary report on the Mollusca," by W. H. Dall (*Bull. Mus. Comp. Zoöl.*, ix, No. 2, pp. 33-144, July to December, 1881). To secure priority, advance sheets of each signature were sent to all

those most interested, and the work has benefited in several cases by the criticism and information thus elicited before its completion. The following new genera or subgenera are proposed: *Ancistrosyrinx*, *Bathymophila*, *Callogaza*, *Fluxina*, *Microgaza*, *Neilonella* and *Turricula*. The family *Pleurotomariidæ* is defined from observations on the soft parts. About 150 new species are described, many of which are liable to turn up or have turned up in far distant regions. The genus *Macrodon* Lycett, hitherto known as a fossil, furnishes a minute representative to the list. The most numerous additions are in the *Solenaconcha*, *Pleurotomidæ*, *Trochidæ*, *Marginellidæ* and the genera *Triforis*, *Neæra*, *Leda* and various opisthobranchiate groups. Among the latter, *Atys*? *bathymophila* (l. c. p. 98) has since proved to belong to the (fossil) genus *Sabalia*. The synonymy of the genus *Puncturella*; of *Pleurotomaria* (which is shown to be quotable as of Sowerby, not, as usually, of DeFrance); of *Crepidula* and of *Gouldia*, is worked out. The latter is shown to be tenable as well as the specific names given by Professor C. B. Adams, in spite of a contrary opinion which had been expressed by Mr. E. A. Smith, of the British Museum, who had in his excellent review of the genus, omitted to observe that the portions of D'Orbigny's *Mollusques de Cuba*, in which his species of *Gouldia* (Adams) were published, dates from later than 1846 (probably 1853); unlike the earlier part, of which advance sheets were issued in 1841-2. The little *Crassatellas*, with which American conchologists are more familiar under the name of *Gouldia* (like "*Gouldia*" *mac-tracea*) than they are with the more tropical type of the genus (*G. cerina* Ad.), are hardly separated by any definite characters from the typical *Crassatella*, though they were called *Eriphyla* by Gabb.

It may be well to call attention to the necessity for circumspection in describing these deep-water forms on which naturalists are working in several countries, to point out that at least two of the writer's species of *Neæra*, *N. limatula* and *lamellifera*, have been redescribed subsequently as *N. contracta* and *N. semi-strigosa*, by Dr. Jeffreys, who, however, atones for his synonymy by some excellent figures. *Modiola lutea* (Jeffr. MS.) Fischer (Journ. de Conchyl., Jan., 1882), is without doubt identical with *Modiola polita* V. and S. The wide range of many of these deep-sea forms and their existence in a fossil state in Italian and Sicilian

Tertiaries, render the work of identification and determination of new forms peculiarly difficult, and the writer himself may doubtless have erred, unintentionally, in taking for new what may, hereafter, be found already described. For all corrections or emendations he will be very grateful. A considerable number still remain to be worked up, of which several will doubtless prove new. There were no new brachiopods in the Agassiz-Sigsbee collection, but in the Agassiz-Bartlett dredgings of the following year there seem to be several, of which a fine *Terebratula*, larger and more elongated than *T. vitrea*, with a strong, squarely flexed anterior margin, relatively small appressed apex, and a loop shaped much like that of *T. sphenoidea* Ph., is proposed to be called *T. bartlettii*, in honor of Commander Bartlett, U.S.N., its discoverer in the deep waters of the Antilles. All the new species will be illustrated in the final report now in preparation.

"Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England" (No. 2), by E. A. Verrill (*Am. Jour. Sci.*, xxii, Oct., 1881, pp. 292-303). In this paper, a continuation of others heretofore mentioned, Professor Verrill gives the details in regard to a number of stations at which deep-sea dredgings were made by the *Fishhawk* in 1880 and 1881, a list of fishes obtained and notes on the more interesting mollusca. In a note *Moroteuthis*, n. g., is proposed with *Lestoteuthis* (?) *robusta* (Dall) V., from the North Pacific, as type. The following new species are described: *Issa ramosa* Verrill and Emerton, *Pholadomya arata* Verrill and Smith, *Mytilimeria flexuosa* Verrill and Smith, *Diplodonta turgida* V. and S., and *Dolium bairdii* V. and S. The latter was also obtained by the Blake expedition in deep water off the Antilles, and is closely allied to a small deep-water Mediterranean species, *D. crosseanum* Monterosato.

"Report on the Cephalopods [of the *Blake* expedition], (etc.)," by A. E. Verrill, (*Bull. Mus. Comp. Zoöl.*, viii, pp. 99-116, 8 pl., March, 1881.) This paper includes figures and descriptions of eight species of cephalopods supposed to be already known, together with *Mastigoteuthis agassizii* V. g. et sp. n., and *Eledone verrucosa*, sp. n. The figures are admirable, the text is revised in the second part of Professor Verrill's "Cephalopods of the N. E. coast of America," elsewhere noticed, which should be consulted for some changes in the nomenclature here used.

Intimately related to the material forming the subject of the foregoing papers, is that treated of in a paper "On certain Limpets and Chitons from the the deep waters off the eastern coast of the United States" (Proc. U. S. Nat. Mus., 1881, pp. 400-414), by W. H. Dall. Certain very ordinary-looking little limpets from deep water were kindly submitted to the author by Professor Verrill, together with specimens of his *Lepetella tubicola*. The examination showed that these forms were of the highest interest, and belonged to two orders, Rhiphidoglossa and Docoglossa, most of the species appearing to be blind. Of the former group there were three species belonging to two genera, both nearer to each other than to any described genus of the order, but differing so much as to necessitate their separation into distinct families which are described as follows: Family Cocculinidæ Dall, containing the genus Cocculina Dall, with the two new species, *C. rathbuni* and *C. beanii*. The dentition closely resembles that of Parmophorus and Helicina, and indicates a relation of this family to the following one, such as in the Pulmonata is sustained by the Cyclostomacea to the Cyclotacea as defined by Troschel. The internal and external anatomy present a curious mingling of features supposed to be characteristic of the Docoglossa and Rhiphidoglossa. The second family, Addisoniidae Dall, includes the genus Addisonia with the new species *A. paradoxa*. This has a remarkable shell resembling Pilidium Midd. (Capulacmæa Sars). It, or closely allied species, has been described from the Mediterranean, under the name of *Gadinia excetrica* Tiberi, but it has no relations with Gadinia. The soft parts are crowded to one side to make room for a curiously exaggerated gill or rather series of branchial leaflets. The dentition is different from anything hitherto recorded in the Rhiphidoglossa, showing Docoglossal features, while the remainder of the anatomy is less like the true limpets than that of Cocculina. Among the Docoglossa the characters of Lepetella Verrill are determined. It presents certain peculiarities and, for the group, a very abnormal dentition, which have led the writer to separate it in a distinct subfamily, Lepetellinæ from Lepeta, etc. *Pectinodonta arcuata*, n. g. et sp., is proposed for a curious form allied to Scutellina, blind and with a dentition composed of one large pectinate lateral on each side of the median line. The writer suggests that the peculiarities of the Docoglossal dentition

may perhaps best be accounted for by conceding to the group a normal dentition of  $\frac{1}{5 \cdot 13 \cdot 3} \cdot 3$  which by consolidation or suppression of teeth would cover all the forms yet investigated.

The species of Chitonidæ found in deep water on the American coast are enumerated, and the paper<sup>1</sup> concludes with a scheme of classification of the Docoglossa brought up to date from that proposed by the writer twelve years previously.

(*To be continued.*)

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## PROGRESS OF INVERTEBRATE PALÆONTOLOGY IN THE UNITED STATES FOR THE YEAR 1881.

BY C. A. WHITE.

WE have not to record the death of any worker in invertebrate palæontology during the past year, and the names of those who have published the results of their investigations during 1881, are mostly well known through their previous labors. The following account of work published during the past year is not really the measure of the amount that has been done; for some of those who are most deeply engaged in the work, have published very little within that time. Those gentlemen have kindly kept me informed of the progress of the work they have in hand, and mention is made of some of these in the following paragraphs:

Mr. S. W. Ford has continued his studies of the primordial fauna, and has published a very interesting paper on the "Embryonic forms of Trilobites from the Primordial rocks of Troy, N. Y., in the *American Journal of Science*, Vol. xxii, pp. 250-259, with 13 woodcuts. Also "Remarks on the genus *Obolella*," in Vol. xxi, of the same journal, pp. 131-134, with 5 woodcuts.

Professor James Hall informs me that "no reports of the New York State Museum having been printed for the past three years," he has a large amount of work awaiting publication. As these works may be expected to appear soon, only brief reference need be made to them now.

<sup>1</sup> This paper did not appear until April, 1882, but on account of its relations to other material here treated of, the recorder has taken the liberty of calling attention to it. Those interested in deep-sea mollusks should also consult a paper in the *Journal de Conchyliologie*, by Dr Paul Fischer, entitled "Diagnoses d'espèces nouvelles de Mollusques recueillis dans le cours des expéditions scientifiques de l'avisole Travailleur (1880-81)," l. c. pp. 49-53, Jan., 1882.